SUPPLEMENTARY INSTRUCTIONS FOR USE OF COLOR BAR PATTERN SLIDE

A color bar pattern slide is enclosed in the accessory package of your Television Analyst to enable you to convert the rainbow pattern which the Model 1075 produces into a color bar pattern of known colors. At this point it might be well to review the principle of operation of a rainbow pattern and then relate it to a color bar pattern.

The different hues that can be produced in a color TV receiver are obtained by shifting the phase of the color sub-carrier of the transmitted signal with respect to the reference burst which occurs during the horizontal blanking interval. For example, if the phase of the sub-carrier is shifted slowly through a complete 360° with reference to the burst signal, the hue will change from yellow to orange, to red then magenta, blue cyan and green, and all of the intermediate hues between those colors. If the phase of the sub-carrier signal is continuously changed thru a full 360° during the interval of one horizontal line and repeats itself for each following horizontal line, a continuous rainbow of colors will be produced. Instead of shifting the phase of the sub-carrier in the Model 1075, we will make the frequency of the sub-carrier lower than the color oscillator in the TV receiver by 15,750 cycles. There will then be a one cycle per line difference between the sub-carrier and the oscillator in the receiver. Since over a period of one horizontal line there is a one cycle difference between the two signals, we have effectively created a 360° phase shift per horizontal line which will repeat itself each horizontal line. This will result in a rainbow display showing each of the colors in the color spectrum from yellow to orange, red, blue and ending in green. This method of producing the color signals is called off-set sub-carrier operation.

By referring to Fig. (1) you will see the vector display of the color information that can be obtained for a phase shift of any given number of degrees. For example, 60° represents a +(I) signal. A 90° phase shift represents +(R-Y). 180° represents +(B-Y) and a +300° represents (G-Y). In order to change a color rainbow signal to a color bar signal, we merely have to blank out those portions of the rainbow display that we do not want and allow the portion of the rainbow that we do want to come through. This we accomplish with the color bar slide enclosed in your accessory package. You will note that there are ten light intervals and nine dark intervals equally

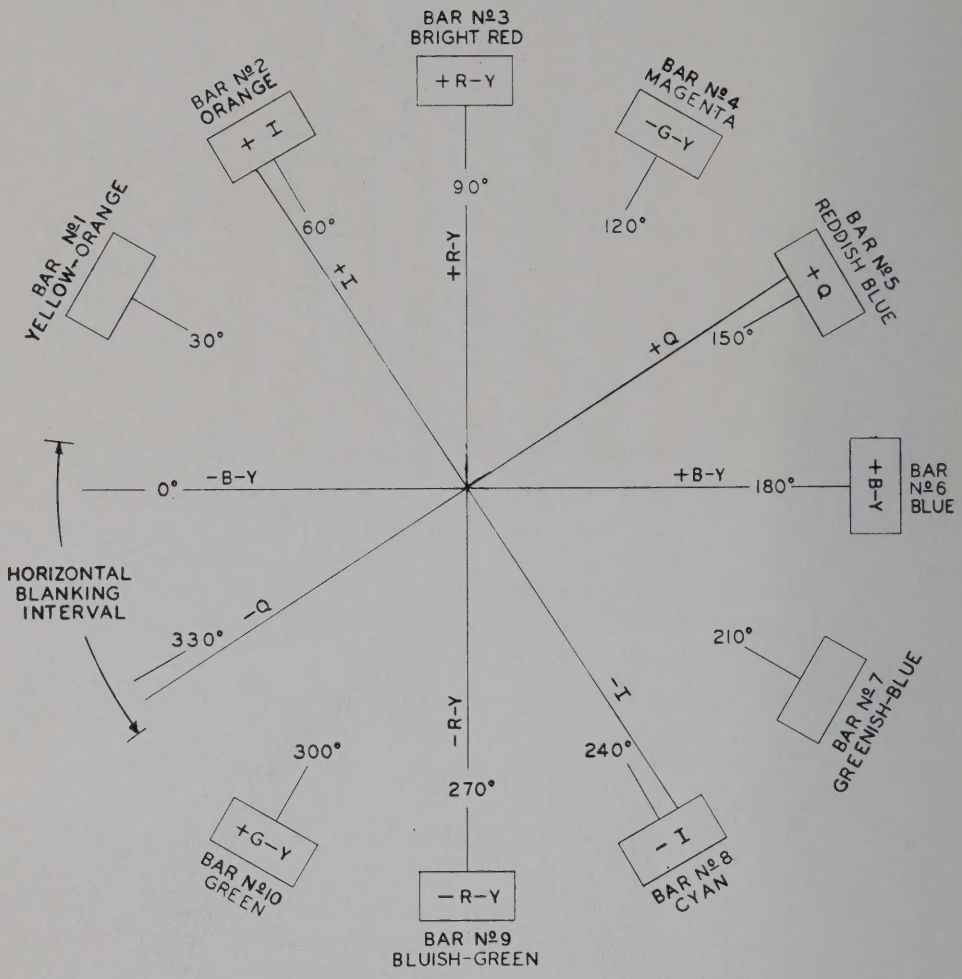


Fig. 1—Vector display showing color bars and angular displacement for each bar.

spaced on the slide. Each bright interval, or bar, represents a color phase shift of 30° and is so placed on the slide as to give the colors as indicated in Fig. (2). You will note for example in Fig. (2) that the second bar is indicated as orange and its color corresponds to +(I) since it is 60° from the reference signal. The sixth bar for example, is a blue color and corresponds to +(B-Y) since it is 180° from reference signal. Fig. (2) will be extremely useful in servicing color TV receivers since it will enable you to evaluate performance of the receiver. It will also enable you to check the range of the hue control and will provide a simple method of color demodulator alignment.

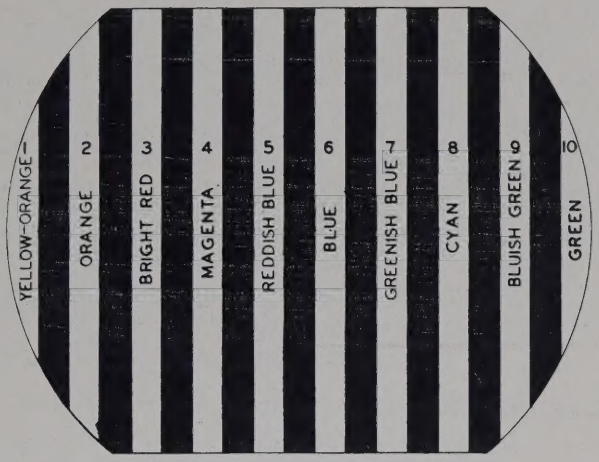


Fig. 2—Color bar pattern showing each bar, its number and its color.

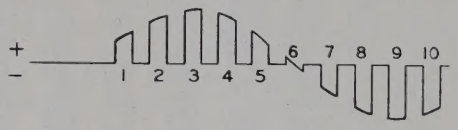
Since most of the color TV receivers in use today demodulate an +(R-Y) and a +(B-Y) signal, our discussion of demodulator alignment will refer to this condition only.

Connect the Television Analyst to the receiver under test and set up and adjust for a proper picture on the TV receiver. Be sure that the horizontal frequency of the Analyst is adjusted to the correct frequency. This is explained in your instruction manual. Turn the color signal on and insert the color bar slide into the Analyst. Adjust video control on the Analyst to get good reproduction of the bars and adjust chroma and hue controls for the proper level of the color signal and that the color bars occur in the proper sequence as shown in Fig. (2). If the color bars do not fall into the proper sequence, the coarse adjustment of the hue range found inside the receiver will center the range of the hue control. At this point it is well to indicate that the horizontal width of the receiver under test should be reduced to be certain that all ten bars are seen.

From fundamental color theory we know that the output of the +(R-Y) demodulator if properly adjusted should have zero +(B-Y) output, and the output of the +(B-Y) demodulator should have zero output of +(R-Y) signal.

Since our color bar pattern has both an +(R-Y) signal which is the third bar, and a +(B-Y) signal which is the sixth bar, we can use these signals to check and align color demodulators.

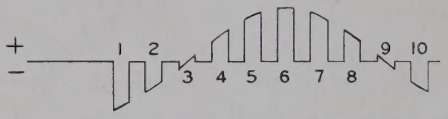
Connect an oscilloscope of adequate band width to the output of the +(R-Y) demodulator. You will see a waveform similar to that shown in Fig. (3). This is viewed at a 15,750 cycle per second sweep on the oscilloscope. The sixth bar which is +(B-Y) should be at zero amplitude as shown in Fig. (3).



R−Y DEMOD.
OUTPUT

Fig. 3—(R-Y) demodulator output as seen on an oscilloscope.

If this condition is not met, set the hue control to its center position and adjust the coarse hue control adjustment which is located within the TV receiver so that the sixth bar is at zero amplitude. Now move the oscilloscope to the output of the +(B-Y) demodulator and adjust the quadrature transformer driving the +(B-Y) demodulator so that the third bar which is +(R-Y) is at zero amplitude as shown in Fig. (4).



B−Y DEMOD.
OUTPUT

Fig. 4—(B-Y) demodulator output as seen on an oscilloscope.

The color demodulators are now properly aligned so that no +(R-Y) signal gets through the +(B-Y) demodulator, and also no (B-Y), signal gets through the +(R-Y) demodulator. Also the front panel hue control is in the middle of its range to allow variations in both directions if necessary.

This completes the hue control and demodulator adjustments.

B & K MANUFACTURING COMPANY

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February 25, 1959

ALL REGISTERED OWNERS OF THE MODEL 1075 TELEVISION ANALYST

Gemtlemen:-

In our ceaseless effort to make the B & K instruments more useful to their owners, we have recently designed a new slide transparency for the Model 1075 Television Analyst.

This new slide transforms the color rainbow of the Model 1075 to a full color bar pattern. Many service men prefer this bar pattern for adjusting color sets. In addition, the slide is marked with the correct colors on it so that a dynamic demonstration can be displayed to the customer as to how his color set is operating.

We are enclosing one of these transparencies for you at no charge.

B & K MANUFACTURING COMPANY

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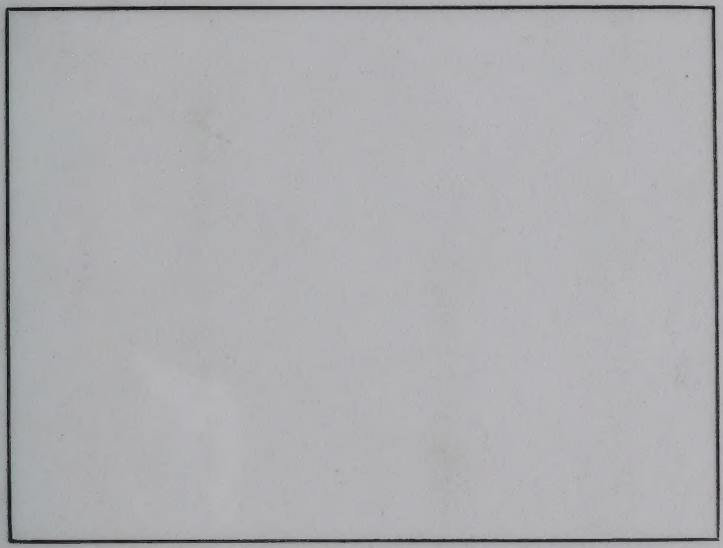

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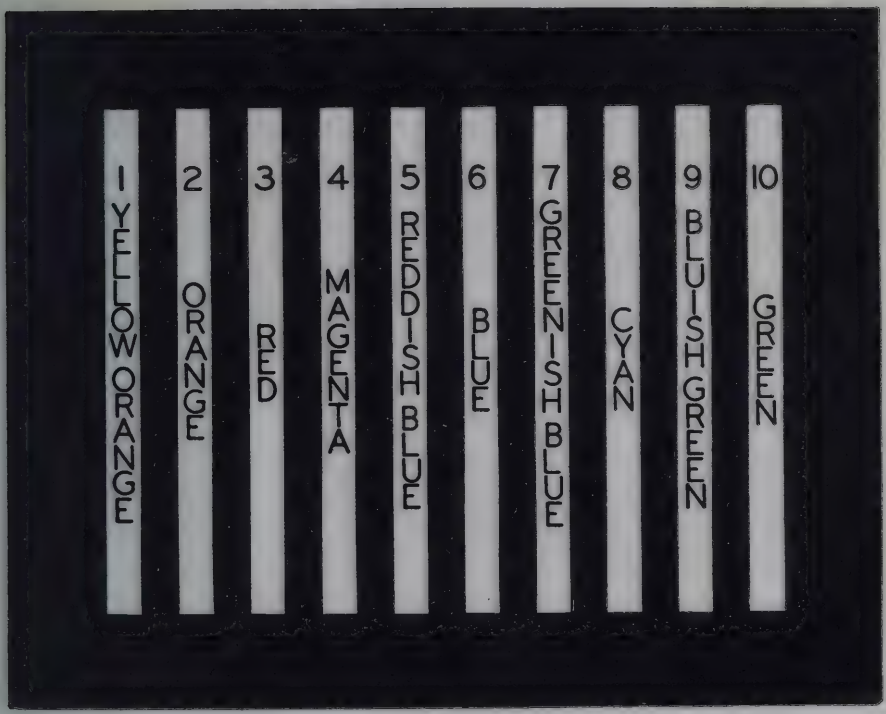
1 YELLOW ORANGE
2 ORANGE
3 RED
4 MAGENTA
5 REDDISH BLUE
6 BLUE
7 GREENISH BLUE
8 CYAN
9 BLUISH GREEN
10 GREEN

FRONT

1 YELLOW ORANGE
2 ORANGE
3 RED
4 MAGENTA
5 RED-VIOLET BLUE
6 BLUE
7 BLUE-VIOLET GREEN
8 CYAN
9 GREEN-BLUE YELLOW
10 YELLOW

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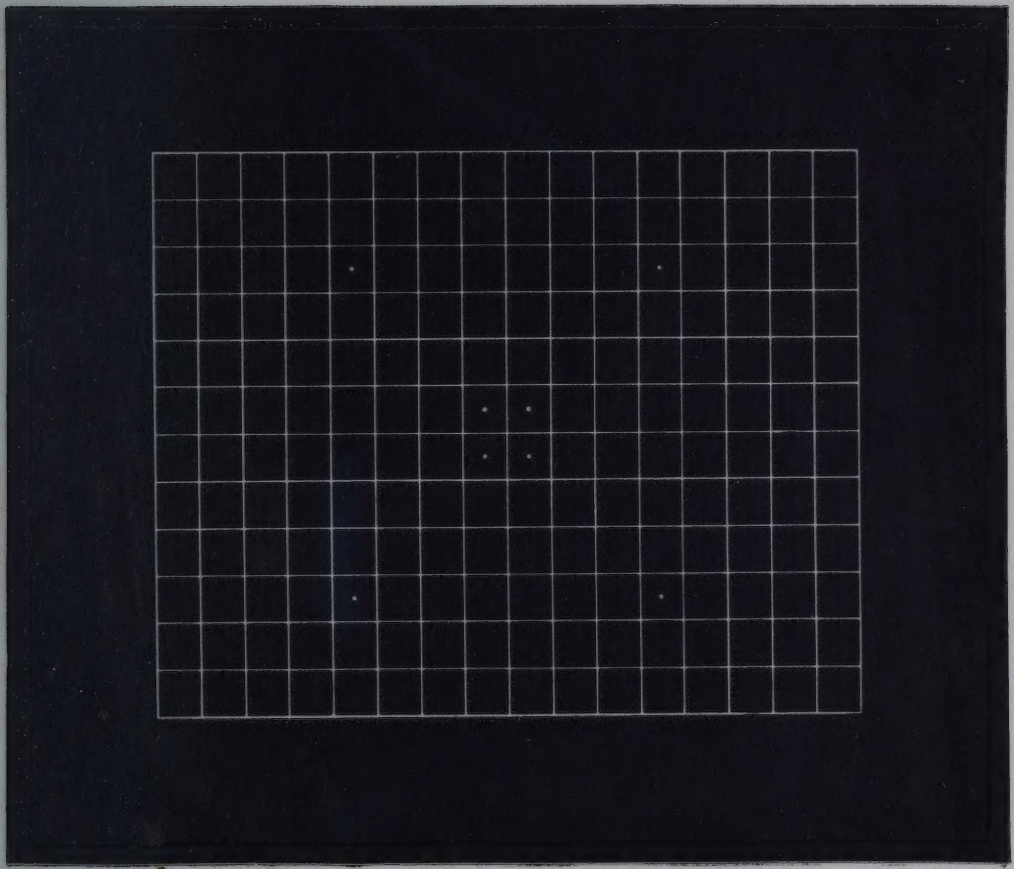

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